Harnessing Lithium: Managing its Extraction in Bolivia for the Common Good

Davis Sehlke

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David B. Spence, Ph.D.
McCombs School of Business and the School of Law
Supervising Professor

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Daniel M. Brinks, Ph.D.
Department of Government
Second Reader

Abstract

Author: Davis Sehlke

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Supervising Professor: David B. Spence

Second Reader: Daniel M. Brinks

The increased adoption of electric vehicles by consumers is likely in the near future, and currently lithium-ion batteries are the preeminent technology for electric vehicles, such as those manufactured by Tesla. Given this scenario, it is also likely that the extraction of lithium will rise in the future and certain countries may benefit from this increased extraction. Bolivia is one of these countries as it has one of the world's largest deposits of lithium. However, it is readily apparent that natural resource extraction can also come with unique and significant challenges, and many governments have failed to properly manage their natural resource wealth. Therefore, my thesis question is, how should the national government of Bolivia best manage the extraction of its lithium deposits? Drawing upon the *Natural Resource Charter*, I systematically examine the Bolivian government's ability to do so, and I identify particular challenges towards natural resource governance that the national government faces. I conclude by summing these challenges and by offering recommendations for these particular issues.

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I. Introduction

Green, renewable, clean, sustainable, this lexicon of buzzwords paints a promising picture for many and is closely associated with climate change and the emergence of new energy sources like wind or solar. Likewise, the introduction of novel technologies ranging from self-driving cars to virtual reality headsets by the likes of Google, SpaceX and a host of other corporations receives a considerable amount of press and attention today. The merging of these two ideas is reflected by the electric and self-driving car manufacturer Tesla briefly passing G.M. as America's most valuable auto company on the basis of future prospects rather than current profits.[1] This nascent world of new technologies and alternative sources of energy reported in the news and on the minds of many perhaps may overlook some of the practical concerns of their adoption. Wind turbines, electric vehicles, solar cells and energy-efficient lighting are all dependent upon components manufactured with certain rare earth metals or other key materials that make these technologies possible.[2] The emergence of these new technologies will require the increased extraction of certain natural resources.

This observation leads to another, which is that countries rich in oil, gas and minerals can face unique and significant social, economic and political challenges; This is sometimes referred to as the resource curse.[3] For instance, "many oil-, gas- and mineral-rich countries have failed to reach their full potential as a result of their natural resource wealth" and that "in

[1] Vlasic, Bill. "G.M. Takes a Back Seat to Tesla as America's Most Valued Carmaker." April 10, 2017. https://www.nytimes.com/2017/04/10/business/general-motors-stock-valuation.html.
[2] "Critical Materials Strategy." November 2011. https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnx0YWN0aWNhbGVhcnRofGd4OjViZjEwZGQ3ZmE3Yzg1YQ.
[3] "The Resource Curse." March 2015. http://www.resourcegovernance.org/sites/default/files/nrgi_Resource-Curse.pdf.

general, they are also more authoritarian, more prone to conflict, and less economically stable than countries without these resources."[4] To mitigate these negative effects, there are frameworks, best practices, and extensive literatures that suggest how to best manage the extraction of natural resources. Therefore, while there could be a net benefit from the adoption of new technologies like electric cars or solar panels, a critical analysis of the effects of this increased natural resource extraction should still occur given the possible ramifications.

This thesis is the pairing of these two observations. Firstly, the increased adoption of electric vehicles in the near future is likely, and lithium-ion battery electric vehicles are currently the preeminent technology. The adoption of electric cars will therefore require the increased extraction of lithium and countries with large resource bases of lithium could possibly stand to benefit significantly in the future. A country that has garnered large amounts of attention for its base of lithium is Bolivia and it is in the process of attempting to utilize this resource. Therefore, my thesis question is, how should the national government of Bolivia best manage the extraction of its lithium deposits?

Following this introduction, a discussion of electric cars and their future adoption will take place. This thesis argues again that the increased adoption of battery electric vehicles is highly likely and that the increased extraction of lithium will occur. This is termed "the scenario" in this thesis and is the basis for a holistic analysis of Bolivia and its deposits of lithium. I then move on to a discussion of lithium extraction particularly within Bolivia and at the Salar de Uyuni. I discuss the current status of this lithium project and also the quality of the Salar de Uyuni's lithium deposits.

[4] Ibid.

Next, I move on to a general discussion of natural resource governance. I discuss the difficulties inherent in the governance of these resources and the ways in which they can provoke conflict or challenge a country. I then discuss a framework that offers best practices and solutions to these challenges, the *Natural Resource Charter*. The *Natural Resource Charter* is the theoretical underpinning of the meat of this thesis, which is the application stage. I specifically apply the *Natural Resource Charter* and its various guidelines and precepts to Bolivia and its lithium project.

The first section of the charter is concerned with domestic foundations for resource governance, and this deals with a country's national strategy in context of natural resources and its institutions. Here, I also discuss Bolivia's national developmental plan, which has been deemed "neoextractivist" by other authors. I also pay attention to the challenge corruption within the Bolivian national government poses, and I conclude the section by discussing Bolivia's civil society and the public's access to information about extractive industries.

The second section of the charter discusses efficient exploration and production operations, as well as the allocation of rights. I discuss property rights in context of the Salar de Uyuni and also indigenous rights. I critique the state's understanding of its lithium resources and also its methodology for partnering with foreign corporations.

The next section, A Good Deal, is almost entirely concerned with the local effects of lithium extraction, particularly in regards to the environment as well as people's livelihoods. I also discuss efforts that the Bolivian national government has taken to consult with local groups and individuals who may be affected by this project. I also examine tourism, quinoa production, and Bolivia's legal frameworks in context of the negative effects of lithium extraction. This

section is one of the most important towards determining the ability of the national government to manage this resource well.

Following this section, I analyze the state' ability to manage revenues gained from national resource extraction. Here, I look to Bolivia's hydrocarbons sector as a source of analysis and conclude that the country appears to use its revenues for the wellbeing of its citizens. The national government has also accounted for the volatility in price of hydrocarbons well by building up its fiscal reserves. I argue that the Bolivian government could manage lithium revenues well but that it also has room for improvement.

The next section, called Sustainable Development, considers the use of revenues to diversify and benefit the economy through effective public spending. I suggest here challenges to the government's ability to effectively manage its public spending programs. I also argue that the Bolivian national government is looking to diversify the economy and to bring in private investment in the near future.

Finally, I conclude by discussing how international organizations, private sector companies, and governments can interact and uphold high environmental, social and human rights standards. I examine the standards that the Bolivian national government maintains. This section is brief in comparison and mostly proposes that the Bolivian government should interact with international organizations to not only support sustainable development but to reach the heights of these standards. This concludes the application stage of my thesis.

The last section is Recommendations. This is the conclusion of the thesis and it functions as an opportunity for me to discuss the challenges that the Bolivian state faces in developing the industrial production of lithium. This section coalesces my findings from the application of

the *Natural Resource Charter* into a comprehensive narrative. I also state ways in which the national government can better manage its governance of the lithium project. Now, I will move on to an in-depth discussion of electric vehicles and their potential adoption.

II. The Scenario

A. Electric Cars and Lithium

For years, the paradigm for automobile manufacturers has stayed relatively the same. Yet, the traditional notion of what an automobile is seems to be evolving as technological achievements like self-driving capabilities or battery electric vehicles (BEVs) become more and more commonplace. In 2005, there existed only hundreds of electric cars but, just 10 years later, the global number of electric cars on the road closed at 1.26 million in the year 2015.[5] Battery electric vehicles have gone from gimmicks to daily drivers for a significant amount of the populace and companies like Tesla are receiving significant amounts of press and attention. Reservations for Tesla's Model 3 at refundable deposit of $1,000 are now approaching 400,000 for the actual launch of a product that has yet to occur.[6] In short, the automobile of today could very well change into a significantly different vehicle over the coming years. Battery-electric vehicles specifically could gain a significant portion of the market share as they become increasingly affordable and, paired with a decarbonized electric grid, could become one major factor in mitigating climate change.

Electric vehicles in particular have been identified as being a partial solution to climate change. International conferences such as the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), which was held in Paris in December of 2015, affirmed the need for electric vehicles when the objective to limit the global

[5] "Global EV Outlook 2016." International Energy Agency, 2016. Web. 2 Feb. 2017. <https://www.iea.org/publications/freepublications/publication/Global_EV_Outlook_2016.pdf>.
[6] Fehrenbacher, Katie. "Tesla's Model 3 Reservations Rise to Almost 400,000." April 15, 2016. http://fortune.com/2016/04/15/tesla-model-3-reservations-400000/.

average temperature increase well below 2°C was set.[7] For greenhouse gas emissions (GHG) to be reduced so as to limit global warming to less than this 2°C target, the global transport sector would need to change significantly. The "transport sector accounts for about a quarter (23%) of global energy-related GHG emissions" and the "ambitious GHG emissions reduction required to limit global warming to less than 2˚C is unlikely to be achievable without a major contribution from the transport sector."[8] Additionally, greenhouse gas emissions from transport are expected to "rise from today's levels by nearly 20 percent by 2030 and close to 50 percent by year 2050 unless major action is undertaken."[9] Therefore, the International Energy Agency suggests that at least 20 percent of all road transport vehicles globally need to be electrically driven by 2030 to meet this 2˚C target.[10] General efforts by states to mitigate climate change could provide one impetus for electric cars to become increasingly popular. However, the general affordability of battery electric vehicles could be a major factor as well.

The success of battery electric vehicles also hinges upon their relative cost to internal combustion vehicles.[11] The key difference in design and cost between battery electric vehicles and internal combustion vehicles is the power train and in particular the battery.[12] However, the true cost of lithium-ion (Li-ion) batteries, which is the dominating technology today, is difficult to ascertain because it is a secret closely held by manufacturers.[13] In *Rapidly falling*

[7] Global EV Outlook 2016.
[8] Ibid.
[9] "Paris Declaration on Electro-Mobility and Climate Change & Call to Action." 2015. Accessed February 3, 2017. http://www.iea.org/media/workshops/2015/transportworkshopatcop/pariselectromobilitydeclaration.pdf.
[10] Ibid.
[11] Nykvist, B., & Nilsson, M. (2015). Rapidly falling costs of battery packs for electric vehicles. *Nature Climate Change, 5*(4), 329-332. doi:http://dx.doi.org.ezproxy.lib.utexas.edu/10.1038/nclimate2564
[12] Ibid.
[13] Orcutt, Mike. "Inexpensive Electric Cars May Arrive Sooner Than You Think." *MIT Technology Review*. N.p., 02 Apr. 2015. Web. 2 Feb. 2017. <https://www.technologyreview.com/s/536336/inexpensive-electric-cars-may-arrive-sooner-than-you-think/>. kWh is an abbreviation of kilowatt-hour, a unit of energy.

costs of battery packs for electric vehicles the authors systematically reviewed over 80 estimates reported from 2007-2014 so as to estimate the costs of Li-ion battery packs for BEV manufacturers; Ultimately, "industry-wide cost estimates declined by approximately 14% annually between 2007 and 2014, from above US$1,000 per kWh to around US$410 per kWh, and the cost of battery packs used by market-leading BEV manufacturers are even lower, at US$300 per kWh, and has declined by 8% annually."[14] These findings have significant implications for the future because they suggest that BEV's could contribute to low-carbon transport through increasing affordability.

Today, battery electric vehicle sales are taking off, although they are still a niche product among early adopters; Along with lower battery costs, "important explanatory factors behind this takeoff include public incentive schemes, and the local or regional presence of charging infrastructure and national manufacturers".[15] In the near term, battery costs "are driven by cell manufacturing improvements, learning rates for pack integration and capturing increasing economies of scale." If BEV sales continue to sustain strong growth for a few years, it is possible that economies of scale will push costs of battery packs towards US$200 per kWh in the near future even without cell chemistry improvements.[16] Tesla's Gigafactory is an example of economies of scale as the company seeks to double the world's production capacity for lithium-ion batteries by 2018.[17] The authors suggest that "there is a convergence of estimates of

[14] Nykvist, B., & Nilsson, M.
[15] Ibid.
[16] Ibid.
[17] Randall, Tom. "Tesla Flips the Switch on the Gigafactory." January 04, 2017. https://www.bloomberg.com/news/articles/2017-01-04/tesla-flips-the-switch-on-the-gigafactory.

battery cost for the whole industry and costs for market-leading car manufacturers in 2017-2018 at around US$230 kWh."[18]

This trend is especially important when looking at the relative cost between battery electric vehicles and traditional internal combustion vehicles. As the authors point out, "it is commonly understood that the cost of battery packs needs to fall below US$150 per kWh in order for BEVs to become cost-competitive on par with internal combustion vehicles."[19] If costs "reach as low as US$150 per kWh this means that electric vehicles will probably move beyond niche applications and begin to penetrate the market widely, leading to a potential paradigm shift in vehicle technology."[20] While there are large uncertainties on past, current, and future costs of LI-ion battery packs, costs ultimately are continuing to decline.[21]

In all, varying reports exist to the extent to which electric vehicles will enter the marketplace, because it is difficult to predict how the costs of energy technologies will fall, and it is also difficult to forecast oil prices.[22] For instance, the article above presents a scenario where costs could continue to decline, without a significant technological breakthrough. On the other hand, the Organization of Petroleum Exporting Countries (OPEC) declared that electric vehicles "are not expected to gain significant market share in the foreseeable future" without a technological breakthrough.[23] I am arguing that the scenario where battery electric vehicles becoming increasingly popular and affordable in the near future is not only possible but likely.

[18] Nykvist, B., & Nilsson, M
[19] Ibid.
[20] Ibid.
[21] Ibid.
[22] Orcutt, Mike. "The 2020s Could Be the Decade When Electric Cars Take Over." MIT Technology Review. February 26, 2016. Accessed February 03, 2017. https://www.technologyreview.com/s/600910/the-2020s-could-be-the-decade-when-electric-cars-take-over/.
[23] Ibid.

This distinct possibility warrants attention because of its implications for areas in the world that have large deposits of the natural resources that make battery electric vehicles possible. Lithium is one of these natural resources, as lithium-ion batteries are the dominating technology for battery electric vehicles. Therefore, the possibly increasing affordability of battery electric vehicles along with their use in mitigating climate change may make the future extraction of lithium much higher than it is today. Grid storage using lithium-ion batteries could also impact the lithium market and increase demand; however, this recent phenomenon has not been accounted for in terms of both adoption and the impact it could have on the extraction of lithium.

The global lithium production in 2014 reached roughly 170,000 t lithium carbonate equivalents (LCE). By 2020, and it is possible that lithium demand will increase to between 230,000 t/a LCE and 270,000 t/a LCE.[24] Likewise, the price for lithium carbonate amounted to 7,200 USD/t in September of 2016, but some estimates see a price jump to 25,500 USD/t no later than 2020.[25] Beyond 2020, it is difficult to find a reliable forecast of the lithium market given that the battery market depends on partially on political decisions, raw materials, and new battery technologies.[26] It is therefore difficult to state or project accurately just how large or valuable the global lithium market could be, given that it is dependent on other factors like the adoption of electric cars. The current lithium market is dominated by a small number of corporations. In 2015, four companies provided 88 percent of the world's lithium but now a

[24] Martin, Gunther, Lars Rentsch, Michael Höck, and Martin Bertau. "Lithium market research – global supply, future demand and price development." *Energy Storage Materials* 6 (2017): 171-79. doi:10.1016/j.ensm.2016.11.004.
[25] Ibid.
[26] Ibid.

host of other companies are seeking to capture shares of the market as demand has grown.[27] One of these companies, FMC Corporation, reported $264 million in segment revenue and full-year segment earnings were $70 million for FMC Lithium. Additionally, FMC Lithium expects its 2017 segment revenue to be approximately between $315 million to $355 million, with full-year segment earnings expected to be between $90 million and $110 million.[28] It is also important to note that just as there are a small number of corporations involved in the extraction of lithium there are also a small number of countries with meaningful lithium deposits. 60% of global lithium resources can be found in South America, especially Chile, Bolivia, and Argentina, which are sometimes called the "lithium triangle".[29] Bolivia is also unique among Chile and Argentina in that it has one of the largest deposits of lithium in the world and that this resource base has not yet been utilized. The creation of an industrial-scale lithium production operation is currently ongoing in Bolivia.

B. Lithium in Bolivia

Bolivia was labeled by many as the "Saudi Arabia of lithium" by the end of 2008, after the country appeared to have a privileged place in the evolving lithium market.[30] In the popular press, Bolivia's massive salt flat, the Salar de Uyuni, was determined to be the largest lithium

[27] Tullis, Paul. "The Great Nevada Lithium Rush to Fuel the New Economy." March 29, 2017. https://www.bloomberg.com/news/features/2017-03-29/the-great-nevada-lithium-rush-to-fuel-the-new-economy.
[28] "FMC Corporation Announces Fourth Quarter and Full Year 2016 Results." February 6, 2017. http://phx.corporate-ir.net/phoenix.zhtml?c=117919&p=irol-newsArticle&ID=2243425.
[29] Martin, et al.
[30] Mares, David R. "Lithium in Bolivia: Can Resource Nationalism Deliver for Bolivians and the World?." (2010) http://bakerinstitute.org/research/lithium-in-bolivia-can-resource-nationalism-deliver-for-bolivians-and-the-world/.

deposit in the world.[31] However, there are varying reports as to how large Bolivia's lithium reserves actually are. The Bolivian government, through its state owned Corporación Minera de Bolivia (COMIBOL), has stated that the Salar de Uyuni has very large in situ resources of 350 Mt of lithium.[32] More recently, the government estimated that Bolivia stores around 70% of the world's lithium reserves, some 100 million metric tonnes.[33] More conservative estimates put Bolivia's lithium reserves between 0.6 and 9.0 Mt.[34] In January of 2010, the U.S Geological Survey also identified lithium resources for Bolivia at 9 million tonnes but the global identified lithium resources were only 22.5 million tonnes.[35] The total for globally identified lithium resources has evolved in recent years. The U.S Geological Survey recently estimated that Bolivia's identified lithium resources to be 9 million tons out of a global total of 40.7 million tons.[36] The consensus, while perhaps not as high as the Bolivian government would like, appears to be that Bolivia does currently contain the largest identified lithium resource base, but its overall percentage of the world's supply has dropped dramatically.

However, lithium production is not dependent on just having the resource in absolute terms. Lithium brine deposits "have several key geologic and/or geographic characteristics such as lithium grade, the magnesium to lithium ratio, and the evaporation rate. Higher grades of

[31] Gruber, Paul, and Pablo Medina. "Global Lithium Availability: A Constraint for Electric Vehicles?" Center for Sustainable Systems. April 2010. Accessed December 07, 2016. http://css.snre.umich.edu/sites/default/files/css_doc/CSS10-05.pdf.
[32] Mohr, Steve H.; Mudd, Gavin M.; Giurco, Damien. 2012. "Lithium Resources and Production: Critical Assessment and Global Projections." *Minerals* 2, no. 1: 65-84.
[33] López, Rafael Sagárnaga. "Bolivia's Lithium Boom: Dream or Nightmare?" OpenDemocracy. December 21, 2015. Accessed December 07, 2016. https://www.opendemocracy.net/democraciaabierta/rafael-sag-rnaga-l-pez/bolivia-s-lithium-boom-dream-or-nightmare.
[34] Gruber, Paul, and Pablo Medina.
[35] "Lithium." Mineral Commodity Summaries. January 2010. http://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2010-lithi.pdf.
[36] "Lithium." Mineral Commodity Summaries. January 2016. http://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2016-lithi.pdf.

lithium and higher evaporation rates decrease the amount of time the brines have to be in evaporation ponds. Finally, lower magnesium to lithium ratios reduce the cost of production, as lower ratios make it easier to separate the magnesium from the lithium."[37]

Ultimately, "the quality of Bolivian lithium deposits is a key concern because it affects the cost of extracting the lithium from the brine and processing it into lithium carbonate. The brine under the Salar has low concentrations of lithium, thereby requiring more drilling and channeling to accumulate the lithium in quantities desired."[38] Additionally, the Salar de Uyuni "has significantly high ratios of magnesium to lithium (compare 18.6:1 to Chile's Salar de Atacama at 6.5:1 or the Argentine Salar de Hombre Muerto at 1.5:1), requiring more expensive extraction and processing to generate lithium carbonate."[39] The Salar de Uyuni also experiences seasonal flooding of the salt flats which "slows the overall evaporative process in the pools relative to the evaporation rate at competing sites and thus contributes to higher costs."[40] One solution, which would extend the evaporation process to eight-to-ten months, would involve the construction of a circuit of evaporation ponds.[41] Finally, the relative harshness and isolation of the region also poses issues towards development because of infrastructure issues.[42]

A pilot operation in 2009 was initiated in the Salar de Uyuni "to determine the technical and economic feasibility of mining and refining the lithium-rich brine". This state owned operation is operated by the General Directorate of Evaporative Resources of the Salar de

[37] Mohr, Steve H.; Mudd, Gavin M.; Giurco, Damien. 2012.
[38] Mares, David R.
[39] Ibid.
[40] Ibid.
[41] Mccormick, Myles. "Bolivia Brimming with Lithium Ambition." Industrial Minerals. August 18, 2016. Accessed December 07, 2016. http://www.indmin.com/Article/3578858/Bolivia-brimming-with-lithium-ambition.html
[42] Mares, David R.

Uyuni, under the state mining company COMIBOL. A number of corporations have also attempted to gain access to Bolivia's lithium; in years past, both South Korea's Posco and France's Eramet have attempted to partner with the state but neither succeeded.[43] As far back as the 1990s lithium extraction has been a possibility. Then, "the campesinos in the area repeatedly petitioned the government to mine the Salar, and in 1990 President Jaime Paz Zamora agreed, in principle, to a multiyear contract with the Lithium Corporation of America (now F.M.C. Corporation), which would have allowed the company to take all the lithium it could, giving Bolivia only eight per cent of the profits."[44] The campesinos then launched a campaign against it as many Bolivians were outraged over the deal.[45]

Recently, after years of hopeful rhetoric and stunted progress, it seems that more significant progress has been made towards a lithium industry in Bolivia. The Gerencia Nacional de Recursos Evaporícitos (GNRE), a wing of Bolivia's mining body COMIBOL, announced that the country had sold 9.3 tonnes of lithium carbonate to China Machinery Engineering Corp; This moment marked Bolivia's symbolic entry onto the international lithium market, given that the lithium carbonate was produced solely by the pilot plant and 98% lithium carbonate sells at $7,000 per tonne.[46] Another pilot volume of 16 tonnes is supposed to follow this initial material.[47] Besides these initial productions of lithium carbonate, more significant plans for extracting the lithium in the Salar have emerged.

[43] Mccormick, Myles.
[44] Wright, Lawrence. "Lithium Dreams." The New Yorker. March 22, 2015. http://www.newyorker.com/magazine/2010/03/22/lithium-dreams.
[45] Ibid.
[46] Mccormick, Myles.
[47] Ibid.

Bolivia, in August of 2016, "signed a contract with German company K-UTEC Ag Salt Technologies to design a lithium carbonate plant" that would be a full scale, 30,000 tonnes per annum industrial plant. Heiner Marx, CEO of K-UTEC, reported that the project design will be finished by September and basic engineering works would be completed by March; Then the GNRE will "put the installation, assembly and commissioning of the facility out to tender (though the state will keep full control of the product)."[48] The completion date of K-UTEC's project design was pushed to the first quarter of 2017, due to the need to modify the brine extraction process given the large volumes of magnesium present.[49] China's Linyi Dake Trade also constructed an ion lithium battery pilot plant in 2014 at the same site.[50] Finally, another Chinese company, CAMC Engineering signed a contract to construct a potassium salt industrial plant. In the wake of these announcements, Bolivia's vice president, Álvaro García Linera, "spoke of the country's lithium resources becoming 'the fuel that will feed the world' and said that this would drive Bolivia to become a continental powerhouse by 2025."[51] Throughout the past decade, this nascent dream of lithium has been at the forefront of discussions by the state as well as local peoples that live by the Salar de Uyuni. The next section of this thesis discusses the extraction of natural resources broadly and then moves on to a discussion of natural resource governance in the context of lithium.

[48] Ibid.
[49] Ibid.
[50] López, Rafael Sagárnaga.
[51] Mccormick, Myles.

III. Natural Resource Governance

Extractive resources, whether they be oil, gas or minerals, can lead to significant conflicts within a state, and over the last two and a half decades, extractive resources have played an integral role in more than a dozen violent intra-state conflicts.[52] The proper management of high-value natural resources is critical for many developing countries in light of the significant social, economic, and political challenges unique to these resources. This challenge, which was briefly mentioned in the introduction, is frequently referred to as the resource curse. This section will discuss the generalized challenges of natural resource extraction to show why natural resource governance is needed.

Conflicts over natural resources often arise when "parties disagree about the management, distribution and protection of natural resources and related ecosystems;" these conflicts can escalate into destructive relationships or violence when the parties "are unable or unwilling to engage in a constructive process of dialogue and conflict resolution."[53] There are particular ways in which natural resources can spur or give rise to conflict. High-value resources and extractive industries (EIs) can contribute to conflict when "the benefits, costs, risks and responsibilities associated with high-value EIs are not shared on an equitable basis", and "decisions are taken without transparency and the involvement of local communities and stakeholders".[54] Additionally, the extraction of natural resources can contribute to conflict if

[52] "The extractive industries value chain as a framework for conflict prevention." June 2015. Accessed February 3, 2017. http://www.un.org/en/land-natural-resources-conflict/pdfs/UN-WB%20Value%20Chain,%20extractive%20and%20conflict%20prevention%20discussion%20paper.pdf.
[53] "Extractive Industries and Conflict." 2012. Accessed February 3, 2017. http://www.un.org/en/land-natural-resources-conflict/pdfs/GN_Extractive.pdf .
[54] Ibid.

"economic, environmental and social impacts are not adequately assessed and addressed."[55] Conflicts can also arise when issues associated with renewable resources and environmental scarcity come into play in areas where natural resource extraction is taking place. For instance, if the availability of key natural resources, such as water, needed to sustain local livelihoods decreases, user groups can come into conflict because of the direct competition over these resources.[56] Land tenure can contribute to conflict as well "when land ownership, management and access are deemed to be unjust or unequal, or when customary practices conflict with formal laws."[57]

The revenues gained from natural resource extraction can be especially problematic. These revenues often concentrate wealth and power in the hands of the few and therefore facilitate inequality, poverty, and levels of corruption.[58] Politicized revenue allocation from natural resources based around various ethnic, religious or regional lines can also be a major driver of conflict; the influence of revenues from high-value natural resources on elites within a state can be a powerful source of underdevelopment and failing economies.[59] Moreover, this revenue can protect "governments from being responsive to the electorate, as other forms of tax collection become less necessary, weakening state-society relations".[60] If the decision-making process becomes removed from the local community and their needs and interests, the neglect and breakdown of a just and fair social contract between the government and the

[55] Ibid.
[56] Ibid.
[57] Ibid.
[58] Ibid.
[59] Ibid.
[60] Ibid.

governed can occur.[61] Historically, "many resource-rich nations in the developing world have, predominantly, been unable to translate soaring Gross Domestic Product (GDP) into corresponding improvements in citizens' welfare".[62]

One way in which a country's economy can be negatively affected by a large increase in natural resources is Dutch disease. This terms refers to the large capital inflows from natural resource extraction which "may lead to an appreciation in the domestic currency, resulting in reduced competiveness and a deterioration of domestic manufacturing and export sectors."[63] The counties of Iran, Russia, Trinidad and Tobago, and Venezuela all have been identified as countries where they have stunted manufacturing sectors or they saw a precipitous decline in manufacturing.[64] One way in which the impact from resource revenues can be mitigated is through government investment in non-resource sector growth or if the government places a portion of its resource revenues in foreign assets.[65] Using resource revenues effectively is a critical challenge that many countries face.

As highlighted above, numerous entry points for conflict or negative externalities exist with the extraction of natural resources. A country can be significantly impacted by conflicts over natural resources or by these negative consequences. The observation of the resource curse and the particularities of natural resource governance has led international institutions such as the United Nations to set out frameworks for the management of natural resource extraction, especially in regards to the convoluted relationships that exist between the various

[61] Ibid.
[62] Ibid.
[63] Ibid.
[64] The Resource Curse.
[65] Ibid.

stakeholders. Another framework is the Extractive Industries Transparency Initiative (EITI) which again sets out principles or a framework for the prudent use of natural resource wealth.[66] These frameworks offer a systematic approach towards the extraction of natural resources that seek to create more equitable scenarios of natural resource extraction. In this thesis, I specifically draw upon the Natural Resource Governance Institute's *Natural Resource Charter*.

The *Natural Resource Charter* is a set of principles "for governments and societies on how to best harness the opportunities created by extractive resources for development."[67] It lays out tools and policy options that are designed to avoid the mismanagement of natural resources and to ensure their ongoing benefits.[68] The *Natural Resource Charter "*was written by an independent group of practitioners and academics, under the governance of an oversight board composed of distinguished international figures with first-hand experiences of the challenges faced by resource-rich countries."[69] Its principles can guide governments' and societies' use of natural resources in hopes that these economic opportunities are fully realized and can result in maximum and sustained returns for a country's citizens.[70] The charter focuses on 12 core precepts that offer guidance on key decisions governments face during the entire process of extracting natural resources.

[66] "The EITI Standard 2016." Extractive Industries Tansparency Initiative. February 23, 2016. https://eiti.org/sites/default/files/documents/english-eiti-standard_0.pdf.
[67] "Natural Resource Charter." Accessed February 03, 2017. http://resourcegovernance.org/approach/natural-resource-charter.
[68] "Natural Resource Charter (2nd ed.)." June 12, 2014. http://www.resourcegovernance.org/analysis-tools/publications/natural-resource-charter-2nd-ed.
[69] Ibid.
[70] Ibid.

In the following section, I apply the *Natural Resource Charter* through its various precepts to the specificities of lithium extraction in Bolivia. In some cases, there isn't information specific to lithium extraction, so I discuss Bolivia and its actions in the context of natural resource governance in general and at some points specifically hydrocarbons. This offered another lens of analysis for applying the *Natural Resource Charter* to Bolivia. I also grouped the precepts of the *Natural Resource Charter* into broad areas following the charter's decision chain. This decision chain is a series of key decisions that are presented in a linear fashion, but are also interwoven with each other. The chain begins with Domestic Foundations for Resource Governance, and then it moves on to Discovery and Deciding to Extract. Next is Getting a Good Deal and then Managing Revenues. Following this is Investing for Sustainable Development, and finally the charter decision chain ends with International Foundations for Resource Governance. Within these groupings, I present the specific precept, the ideas they are based upon, and then with supplementary information specific to Bolivia I discuss this criterion and apply it. I will now discuss lithium extraction in Bolivia within the context of the first section, Domestic Foundations for Resource Governance, and then move on through the entire charter decision chain.

IV. Application of the Natural Resource Charter

A. Domestic Foundations for Resource Governance

The first section of the *Natural Resource Charter* is concerned with the broad, domestic foundations of a government that are themselves related to resource governance and is based off of precept one and precept two. Natural resource wealth can be a great benefit to a country, but can also, if mismanaged, lead to conflict or otherwise impose severe costs on a country. Typically, it is a governments' responsibility to actively manage extractive resources and the first precept acknowledges this relationship stating, "resource management should secure the greatest benefit for citizens through an inclusive and comprehensive national strategy, clear legal framework and competent institutions".[71] The implementation of a national strategy can guide a government's decisions so that its natural resource management is both effective and sustainable.[72] Bolivia's national strategy can be gauged within the context of neoextractivism and specifically its "Strategic Plan for Lithium Industrialization".

The Bolivian national government has been deemed by many to operate under a general neoextractivist development plan. Neoextractivism specifically "refers to the expansion of the state's role in the extractive sector and growing use of related revenues for social spending and development projects for citizens."[73] This term is also paired with extractivism to refer to the renewed emphasis on natural resource extraction as a growth strategy in Latin

[71] Natural Resource Governance Institute. 2014. Natural Resource Charter. Second Edition, New York: NRGI.
[72] Ibid.
[73] Schilling-Vacaflor, Almut. "'If the company belongs to you, how can you be against it?' Limiting participation and taming dissent in neo-extractivist Bolivia." *The Journal of Peasant Studies* 44, no. 3 (2016): 658-76. doi:10.1080/03066150.2016.1216984.

America.[74] This development path has been most pronounced in the countries of Bolivia, Ecuador, and Venezuela.[75] In 2006, Evo Morales and his Movimiento Al Socialsimo (MAS, Movement Towards Socialism) "implemented a political project which has been presented as radically alternative to neoliberalism" and "an important aim of this project has been to diversify the economy and strengthen communitarian productive forms, as part of a perceived need to shift away from primary export-based development."[76] Despite this stated goal, the Morales administration has maintained neoextractivist development.

Bolivia's recent economic growth is partially attributable to this neoextractivist development plan. Bolivia's economic growth averaged 4.9 percent between 2004 and 2014 in part due to high commodity prices and a prudent macroeconomic policy.[77] This favorable economic growth led to a reduction in moderate poverty, which fell from 59 percent in 2005 to 39 percent in 2014.[78] Bolivia's recent strong economic growth has been attributed to captive markets for natural gas exports; gas accounts for roughly 50% of Bolivia's total exports.[79] Bolivia also nationalized its hydrocarbon industry in 2006, and YPFB, *Yacimientos Petroliferos Fiscales Boliviano*, is the state-owned company that now has a monopoly over Bolivia's petroleum resources.[80]

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[74] Andreucci, Diego, and Isabella M. Radhuber. "Limits to "counter-neoliberal" reform: Mining expansion and the marginalisation of post-extractivist forces in Evo Morales's Bolivia." *Geoforum*, 2015. doi:10.1016/j.geoforum.2015.09.002.
[75] Ibid.
[76] Ibid.
[77] Bolivia Overview." The World Bank. October 3, 2016. http://www.worldbank.org/en/country/bolivia/overview#1.
[78] Ibid.
[79] "The World Factbook: Bolivia." Central Intelligence Agency. November 10, 2016. https://www.cia.gov/library/publications/the-world-factbook/geos/bl.html.
[80] "Bolivia." Natural Resource Governance Institute. February 20, 2016. http://www.resourcegovernance.org/our-work/country/bolivia.

Lithium has taken a central position in the conception of Bolivia's future economy, and development of Bolivia and can be understood within the context of this national development plan. The inauguration, in 2008, of the state-run lithium industry "brought great hope and heightened expectations regarding Bolivia's ability to rewrite its long and troubled history with natural resource extraction".[81] COMIBOL also called "progress in lithium industrialization a 'dream-come-true' for the struggling southwest region of Potosí, and this industrialization is seen as the route to paved roads, economic prosperity, and the ending of "plunder and poverty related to natural resources in the country."[82] This rhetoric falls in line with this neoextractivist framework. Evo Morales might have said it best: "after petroleum and natural gas, lithium is very important to the economy. But the moment we begin to develop the industrialization of lithium it will become the most important."[83]

Bolivia's national strategy can also be gauged through its ambitious "Strategic Plan for Lithium Industrialization" which called for a $900 million commitment to the development of a state-run industry. The plan itself called for Bolivia to extract and process lithium for commercial use on its own and Bolivia was prepared to finance the entire chain of production, including a battery plant.[84] Initially, the government expected production capacity to start up in 2013 with the development of larger industrial and chemical plants, and full scale battery production was set to begin in 2014.[85] While Bolivia has been producing pilot volumes of

[81] Revette, Anna C. "This Time It's Different: Lithium Extraction, Cultural Politics and Development in Bolivia." *Third World Quarterly*, February 10, 2016, 1-20. doi:10.1080/01436597.2015.1131118.
[82] Mccormick, Myles.
[83] Wright, Lawrence.
[84] Achtenberg, Emily. "Bolivia Bets on State-Run Lithium Industry." NACLA. Accessed March 05, 2017. https://nacla.org/news/bolivia-bets-state-run-lithium-industry.
[85] Ibid.

lithium carbonate, it is still years away from realizing the goals that it set out for 2013 and 2014. Despite years of failed partnerships and production, Bolivia's recent partnership with K-UTEC AG Salt Technologies suggests that the state is now making progress towards its goal. Bolivia's own Gerencia Nacional de Recursos Evaporícitos (GNRE), a wing of its national mining company COMIBOL, will still need to put the installation, assembly and commissioning of the production plant out to tender once this is complete. Therefore, the GNRE's goal of bringing online a 15,000 TPA (tonnes per annum) lithium carbonate production line in the third quarter of 2018 may still be further away than estimated. It is difficult to say when these goals will be realized, and this strategic plan should be reevaluated given the circumstances above.

Bolivia's decision to push ahead with extraction may be suspect as well. The GNRE has indicated numerous times that it has the requisite evidence from its pilot plant to move on to the next stage in developing the Salar, but this evidence has never been verified by an external audit.[86] Without clear feasibility studies, "it is difficult to attest to all the state enterprise indicates".[87] Juan Carlos Zuleta, a La Paz-based lithium economics analyst suggested that after six years of pilot work "they realized they were late" to the lithium market and are "pushing ahead to industrial plant stage in spite of pilot test results rather than because of them."[88]

The Bolivian government's estimates of its capabilities to bring lithium to market fall in line with the rhetoric the state attaches to its reserves of lithium and neoextractivism. Evo Morales has stated that "the state will never lose sovereignty when it comes to lithium" and

[86] Ibid.
[87] Ibid.
[88] Ibid.

that "from this brine, there will be lithium cars coming out of Bolivia, this is the dream."[89] Again, conceptualized within the lithium resource base itself, is a goal of development and the attainment of revenues. The ambition or moreover the dream of lithium as a step to revitalization may harm the country if it is pursued haphazardly. The Bolivian government has clearly signaled that lithium is of great importance to the state both rhetorically and financially. However, this rhetoric hasn't been consolidated into a comprehensive national strategy. While the state is now making more progress towards the opening of a large scale production plant, investing in this industry without a comprehensive understanding of its lithium resources could harm or damage the state. This nascent dream of lithium may not come to light if the pursuit of extraction continues without a comprehensive understanding of not only its reserves but the specificities of those reserves, i.e. the brine's magnesium content or the evaporation rate of the Salar. While the extent to which Bolivia has a comprehensive national strategy for the extraction of lithium is unclear, the state does have a clear legal framework through which it can operate.

The Bolivian government in 1974 declared the Uyuni Basin to be a Fiscal Reserve. This designation "gives the Bolivian state ownership of the Salar and the legal right to exploit and administer all of the natural resources within the reserve's boundaries."[90] Legislation in 2008 declared the development of natural resources from the Salar de Uyuni to be a national priority and with the specific goal of supporting economic and social development in Potosí.[91] The

[89] Wright, Lawrence.
[90] Ray, Rebecca, Kevin Gallagher, Andrés López, and Cynthia Sanborn. *China and Sustainable Development in Latin America: The Social and Environmental Dimension*. London: Anthem Press, 2016.
[91] Ibid.

constitution also inscribes the state's right to develop natural resources. Article 349 states that "natural resources are the property and direct domain, indivisible and without limitation, of the Bolivian people, and their administration corresponds to the State on behalf of the collective interest."[92] The state "shall assume control and direction of the exploration, exploitation, industrialization, transport and sale of strategic natural resources through public, cooperative or community entities, which may in turn contract private enterprises and form mixed enterprises."[93] Towards profits, the constitution maintains that "profits obtained from the exploitation and the sale of the natural resources shall be distributed and reinvested to promote economic diversification in the different territorial levels of the State" but that "processes of industrialization shall be carried out with preference given to the place of origin of the production, and conditions shall be created which favor competitiveness in the internal and international market."[94] Finally, the state also is to "promote primarily the industrialization of renewable and nonrenewable natural resources, within the framework of respect for and protection of the environment, in order to guarantee the generation of employment and the economic and social consumption of the population."[95] By law, environmental and social impact assessments must be performed, although the results are not published.[96]

In conclusion, the Bolivian state has legal authority and property of the entire Salar and is the final arbitrator of lithium extraction within this area. Additionally, the constitution of the state inscribes these rights as well, and sets out a legal precedent for the state to pursue lithium

[92] "Bolivia (Plurinational State of)'s Constitution of 2009." Constitute Project. Accessed March 5, 2017. https://www.constituteproject.org/constitution/Bolivia_2009.pdf.
[93] Ibid.
[94] Ibid.
[95] Ibid.
[96] "Bolivia." Natural Resource Governance Institute.

extraction. This constitutional framework in regards to natural resources also maintains a preference for the industrialization of the Potosí Department and gives some weight to natural resource governance in light of the government. In all, the Bolivian government through its constitution and the declaration of the Salar de Uyuni as a fiscal reserve maintains and exerts control of this resource more so than any other stakeholder. However, it also maintains within the constitution the concerns of other stakeholders. The next section will discuss Bolivian institutions and whether they are competent.

The implementation of an industrial lithium plant could be undermined by corruption within Bolivian society. For instance, "the judiciary, the police and the public administration more broadly are perceived as the most corrupt institutions of the country" and experts have described corruption as an "institutionalized and socially accepted norm" within Bolivia, particularly in regards to the widespread use of facilitation payments.[97] Despite an institutional and legal framework that appears robust, Bolivia still faces significant difficulties here. The lack of capacity and resources undermine these new institutions, while "low salaries, lack of training and a burdensome bureaucracy continue to create opportunities and incentives for corruption."[98] Towards lithium specifically, "the development of the lithium exploitation plan is shared between government bodies known for their lack of transparency" and a "frequency of conflict of interest problems."[99] YPFB, the state-owned hydrocarbons company, has been the source of scandals that have ranged from "nepotism in appointments to major kickbacks that

[97] Ibid.
[98] Wickberg, Sofia. "Overview of corruption and anti-corruption in Bolivia ." September 27, 2012.http://www.transparency.org/files/content/corruptionqas/346_Overview_of_corruption_in_Bolivia.pdf.
[99] Ibid.

led to the dismissal and sentencing of the head of the company."[100] The Bolivian government has implemented robust anti-corruption legal frameworks, but again, the insufficient abilities and resources of the administration have not significantly decreased corruption.[101] Corruption could significantly hinder Bolivia's ability to utilize its lithium resources. This affects the state entirely along the entire charter decision chain. For instance, corruption could affect the foreign corporations that the state partners with. Later on, revenues from lithium could be diverted from social programs or municipalities to the pockets of various officials. Weak institutions are a key concern for Bolivia.

The next precept in this section discuss the ability to accrue benefits from natural resources with the public. Resource wealth can lead to sustained prosperity if the government is publicly accountable and scrutiny of behavior can occur so as to provide a deterrent against corruption and an incentive for performance.[102] Information should be transparent along the entire chain of decisions, and nationally owned resource companies should be transparent as well in their strategies and spending.[103] Therefore, the second precept states, "Resource governance requires decision makers to be accountable to an informed public."[104] Bolivia's civil society can check the government in this regard, but there are concerns given the country's lack of transparency in regards to information. Bolivia's civil society and its ability to hold decision makers accountable can be partly observed through the operation of the media within Bolivia as well as its treatment of non-governmental organizations.

[100] Ibid.
[101] Ibid.
[102] Natural Resource Charter.
[103] Ibid.
[104] Ibid.

Bolivia's civil society has a number of very active non-governmental organizations.[105] These organizations have provided checks to the state, so much so that their relationship with the current administration of President Evo Morales is contentious. In 2015, four NGOs, who conduct investigations on economic, social, labor, environmental, and agrarian issues in Bolivia, were accused of lying and political meddling to advance the interests of foreign governments and corporations.[106] However, it has been suggested that this controversy has "arisen amidst escalations between the Morales government and indigenous, environmental, and civil society organizations that have challenged Bolivia's growing dependence on an extractivist development model."[107] One NGO, CEDIB, documented deficiencies in recent community consultation processes in regards to oil and gas development; another, Fundación Tierra, investigated "changes in government agricultural policy that favor agribusiness interests, limit opportunities for land redistribution, and contribute to the marginalization of peasant farmers."[108] The government has argued that "NGOs have become 'less and less relevant' under Morales's 'government of the social movements,' which represents and incorporates indigenous and peasant sectors at all levels, obviating the need for intermediaries or advocates."[109] Morales himself has argued that "we don't need NGOs using social and environmental movements to create opposition and conspire against the state".[110] NGOs have played an important part in Bolivia by challenging some of the actions of the national

[105] Wickberg, Sofia
[106] Achtenberg, Emily. "What's Behind the Bolivian Government's Attack on NGOs?" September 3, 2015. http://nacla.org/blog/2015/09/03/what%27s-behind-bolivian-government%27s-attack-ngos.
[107] Ibid.
[108] Ibid.
[109] Ibid.
[110] Ibid.

government in regards to resource extraction, and they play an important role in the promotion of an active civil society that can scrutinize the behavior of the government.

The Bolivian media is another facet of civil society that can report on and scrutinize the government's behavior in regards to lithium, but there are problems here. For instance, "there is a strong divide between the private media, leaning towards the views of the opposition, and the state-owned media", which is notoriously pro-Morales.[111] The national government pushed back against the opposition with the passing of a controversial anti-racism law in 2010 that allowed for economic sanctions and the suspension of licenses of media outlets expressing racist views; Bolivian law guarantees freedom of expression and freedom of the media, so experts and journalists have considered this law to be a violation.[112] Media within Bolivia is contentious, but journalists at the moment can still operate as a check on the national government.

In regards to information and reporting practices, there are again concerns. A number of government agencies publish data on extractive industries, but "this information is scattered and incomplete".[113] The Transparency and Access to Government Information Law dictates "that all institutions in the executive branch of government must publish their revenues and satisfy access to information requests in a timely manner."[114] However, there is "a lack of awareness of the obligation to provide information; a sense of ownership of information on the part of government officials; scant training in this area; a high turnover of responsible public

[111] Wickberg, Sofia.
[112] Ibid.
[113] "Bolivia." Natural Resource Governance Institute.
[114] Wickberg, Sofia.

servants; and a sense of inability on the part of society to request information".[115] In all, this lack of information may contribute or make subservient interests or concerns of the populace in regards to natural resource extraction in Bolivia. This lack of implementation allows Bolivia's various nationalized resource companies to not be fully transparent in their conduct. This lack of information can also affect civil society's ability to report on and scrutinize the behaviors of governmental officials. This precept and its application indicates that the Bolivian national government has much to do in this area to effectively manage natural resource extraction.

B. Discovery and Deciding to Extract

This section is concerned with efficient exploration and production operations. Here, precept three of the *Natural Resource Charter* states that "the government should encourage efficient exploration and production operations, and allocate rights transparently."[116] Firstly, this can be done by ensuring that the government has uncontested jurisdiction over areas it intends to open for exploration and that is also has a thorough understanding of its resource base.[117] The government must also decide who should undertake exploration and production operations and to do so efficiently.[118] So far, the property rights of the Salar de Uyuni are in question, and there is a degree of uncertainty about the resource base of the Salar. Bolivia has also not encouraged efficient exploration and production operations either.

[115] Ibid.
[116] Natural Resource Charter.
[117] Ibid.
[118] Ibid.

Firstly, the securing of property rights to the Salar has lacked transparency because there are some disputes over the mineral wealth of the Salar. Additionally, the Bolivian government has in other instances also prioritized hydrocarbon companies' property rights over indigenous claims to territory, suggesting that this isn't unique to lithium or the Salar de Uyuni. The 1974 declaration of the Salar de Uyuni and its mineral resources gives the Bolivian state basic ownership of the Salar and the legal right to the natural resources within the reserve's boundaries. However, since that time, the boundaries of the fiscal reserve have been moved and expanded five times.[119] Teodoro Blanco, a legal territorial advisor to communities in Nor Lípez, Southwest Potosí argues this a problem: "We were never consulted when the boundaries of the fiscal reserve were determined and re-determined despite the fact that our communities and crop fields fall within its boundaries. Now that we are struggling to gain collective titles to our lands, a right that we are afforded by Bolivia's constitution, we are running into problems."[120] Within Bolivia, "hydrocarbon companies' property rights have taken priority over indigenous claims to territory; indigenous populations have not had access to the information that states and companies control regarding natural gas extraction, even when this extraction occurs in spaces occupied and used by indigenous people".[121] This occurs despite the fact that the Bolivian constitution requires that "the right to prior obligatory consultation by the State with respect to the exploitation of nonrenewable natural resources in the territory [indigenous peoples] inhabit shall be respected and guaranteed, in good faith and upon

[119] Rebecca Hollender and Jim Shultz. "Bolivia and its Lithium: Can the "Gold of the 21st Century" Help Lift a Nation out of Poverty?" Democracy Center. May 2010. http://democracyctr.org/dc_old/wp content/uploads/2011/10/DClithiumfullreportenglish.pdf
[120] Ibid.
[121] Bebbington, Denise Humphreys. "Extraction, inequality and indigenous peoples: Insights from Bolivia." *Environmental Science & Policy* 33 (2013): 438-46. doi:10.1016/j.envsci.2012.07.027.

agreement."[122] However, "the participatory rights of affected communities have been viewed by representatives from the state and extraction companies as obsolete and have in practice often been absent or limited to a formality".[123] The "right to prior consultation has been increasingly called into question and viewed as obsolete by state decision makers and corporate representatives alike" as "nationalized corporations and the plurinational state have been framed in the public discourse as belonging to 'all Bolivians".[124] In this case, the fiscal reserve and its boundaries may be contentious given the narrative above and suggests that indigenous property rights or territorial claims may be put to the wayside. This process lacks the transparency towards the determination of property rights suggested by this precept.

Secondly, as mentioned within the background section on the Salar de Uyuni, Bolivia's government has maintained that its resource base is far above and beyond that of other estimates. However, it is difficult to know whether this claim is state rhetoric, an accurate claim of its resource base, or a blatant misunderstanding of its resource base. The Bolivian government, through COMIBOL, has stated in the past that the Salar de Uyuni has in situ resources of 350 million tons of lithium.[125] It has also claimed a 100 million metric ton base of lithium, which may be suspect as well. Other estimates are again far more conservative. I am inclined to think that these estimations are exaggerations, given other widely available estimates, but the validity of this claim is difficult to determine given the generally secretive nature of extractive industries. I am also skeptical of the Bolivian government's estimates

[122] Bolivia (Plurinational State of)'s Constitution of 2009.
[123] Schilling-Vacaflor, Almut.
[124] Ibid.
[125] Mohr, Steve H.; Mudd, Gavin M.; Giurco, Damien.

because they may be used for political purposes that fall in line with neoextractivist rhetoric. An inadequate understanding of this resource base could pose problems later on. At the minimum, there is a degree of uncertainty in regards to Bolivia's lithium base.

Finally, the Bolivian government's methodology for partnering with foreign firms for exploration and production operations has not occurred efficiently. To reiterate, Bolivia is still significantly behind schedule. Bolivia's reluctance to involve foreign investment has possibly left it behind when compared to the marketplace. In 2009, the Bolivian government was in talks with "France's Bollore Group, South Korea's LG Group and Japan's Sumitomo and Mitsubishi".[126] Carlos Alberto López, a former energy minister and consultant with Cambridge Energy Research Associates, suggested that "Bolivia's ideological face does not square with business and commercial realities. I doubt lithium's potential will be realized in the short or medium term."[127] Typifying these difficulties may be the case of Korea's involvement in lithium extraction in Bolivia. In 2012, "Korea's state-run mineral development corporation set up a joint venture with its Bolivian counterpart to develop lithium products".[128] This joint venture involved the KORES consortium (LG International Corp., Kyungdon Co., Union Corp., and Aju Corp.), POSCO, Korea's leading steelmaker, and COMIBOL, Bolivia's prior lithium corporation.[129] COMIBOL was to provide the lithium, nickel and manganese while this Korean consortium was to manufacture battery-related parts and other battery products.[130] Yet, these contracts

[126] Carroll, Rory, and Andres Schipani. "Multinationals eye up lithium reserves beneath Bolivia's salt flats." June 17, 2009. https://www.theguardian.com/world/2009/jun/17/bolivia-lithium-reserves-electric-cars.
[127] Ibid.
[128] "Korea, Bolivia set up joint lithium development venture." July 07, 2012. http://www.koreatimes.co.kr/www/news/sports/2012/07/182_114651.html.
[129] Ibid.
[130] Ibid.

ultimately failed later on, with the Korean ambassador in La Paz arguing that Bolivia was missing an opportunity to enter the world lithium market.[131] Luis Echazú, affiliated with the former nationalized company, GNRE, stated in the past that Bolivia is entering the marketplace at the right time, given that "the lithium boom will begin around 2020", and that "consumption in the last five years has grown at around five or six per cent".[132] The Bolivian national government still maintains that it is on the right track in regards to industrializing its lithium resources.

There are still questions to whether or when the lithium of the Salar de Uyuni will be effectively utilized. K-UTEC AG Salt Technologies, who was contracted in August of 2105 to design an industrial plant to produce lithium is still months behind schedule and there is "no clear and consistent reference to the state of [sic] situation regarding the elaboration of this design."[133] Juan Carlos Zuleta stated, "I am really worried we are going to miss this huge opportunity to become a lithium power in the world".[134] As emphasized above, the Bolivian national government has had difficulties partnering with foreign partners, and in the future it may continue to do so because of its stance towards its lithium deposits and its conception of this resource within the larger economy.

[131] "Korea says that Bolivia is missing an opportunity to sell lithium." July 26, 2016. http://evworld.com/blogs.cfm?blogid=1387.
[132] López, Rafael Sagárnaga.
[133] Mccormick, Myles.
[134] Ibid.

C. A Good Deal

This section of the *Natural Resource Charter* and its application to Bolivia illustrates certain steps that a country can take to ensure that they are benefiting from natural resource extraction. Among other things, this involves mitigating potential damages that people or the environment may bear as well as capturing value from the extraction for the country through tax revenues. Within this section, I will largely focus on precept five, which is concerned with environmental and social costs, but I will briefly mention the other precepts.

First, precept four proposes that "tax regimes and contractual terms should enable the government to realize the full value of its resources consistent with attracting necessary investment, and should be robust to changing circumstances."[135] This precept was difficult to apply to lithium as the terms the national government is offering foreign partners is generally secretive. In the past, the national government has indicated that it wants to retain at least 60% of the profits from any partnership.[136] The country's reluctance to involve foreign investment in this process has possibly stunted Bolivia's ability to utilize its lithium resources.[137] Beyond this information, it is difficult to comprehensively apply precept four, but this guideline should be applied by the Bolivian national government in regards to lithium. One of the most immediately pressing concerns for the extraction of lithium in Bolivia is the possible negative effects this extraction may cause on the environment and local livelihoods.

[135] Natural Resource Charter.
[136] Achtenberg, Emily. "Bolivia's Lithium Challenge." NACLA. Accessed April 30, 2017. https://nacla.org/news/bolivia%E2%80%99s-lithium-challenge.
[137] Mccormick, Myles.

A primary concern of all natural resource governance is the consideration of the environmental and social costs that often affect the people in the vicinity of natural resource extraction. Effective resource management should minimize the costs for affected communities, while realizing the benefits.[138] Local communities should be involved in the decision making process and the government should clearly establish and define ownership rights to sub-soil wealth, including the assignment of subsequent revenues.[139] Efforts should be made to measure and mitigate any negative effects from extraction, and to take into account opportunities to develop other local benefits from extraction. Ultimately, there may be a dichotomy between the interests of a local population and that of a country as a whole, so remediation should occur if local groups are negatively impacted.[140] These concerns are capsulated by precept five which advocates that "the government should pursue opportunities for local benefits, and account for, mitigate and offset the environmental and social costs of resource extraction projects".[141]

It is important to note that there is some local support for this project, but that it is contentious; the Uyuni Regional Peasant Federation initially proposed the industrial lithium mining project.[142] The government has solicited the involvement of the local communities on a number of occasions, such as the inauguration of the lithium pilot plant, but there are groups and individuals who did not participate in this process and claim that they were never consulted about the existence or location of the pilot plant.[143] Members of the local community also were

[138] Natural Resource Charter.
[139] Ibid.
[140] Ibid.
[141] Ibid.
[142] Achtenberg, Emily. "Bolivia's Lithium Challenge."
[143] Rebecca , Hollender, and Jim Shultz.

concerned that the groups that were consulted had political ties to the Morales government and the MAS party; For instance, local quinoa producer groups were interviewed and they claimed that they hadn't been consulted despite the fact that this project could greatly impact them.[144] COMIBOL officials also were "unable to provide a clear methodology for their plan to ensure local participation and mitigate social impacts of the project, even though they cited the importance of doing so."[145] The opaque nature of these consultations suggests that the Bolivian national government is willing to push ahead with the project despite concerns, and it does not seem that the state is actively looking to mitigate potential effects. There are also local concerns about the allocation of revenues.

While some of Potosí's indigenous communities welcome the new lithium industry, there "are unresolved issues related to land-ownership and resource royalties".[146] For instance, "Potosí civic and union leaders believe the department is entitled to a greater part of the lithium benefits for local development; in 2011, the government allocated just 5 per cent of lithium royalties to the area."[147] The local communities also expect the industrialization of lithium to result in investments to infrastructure and education in the area.[148] This sentiment is summed up by one local salt gatherer who said "we know that Bolivia can become the Saudi Arabia of lithium. We are poor, but we are not stupid peasants. The lithium may be Bolivia's,

[144] Ibid.
[145] Ibid.
[146] Minority Rights Group International, *State of the World's Minorities and Indigenous Peoples 2012 - Bolivia*, 28 June 2012, available at: http://www.refworld.org/docid/4fedb407c.html [accessed 6 March 2017]
[147] Ibid.
[148] Carbonnier, Gilles, and Elizabeth Jiménez Zamora. "Can Lithium Energize Sustainable Development in Bolivia? Institutional and Policy Challenges." *Journal of Environmental Science and Engineering*, September 20, 2013. http://www.davidpublishing.com/davidpublishing/Upfile/4/16/2014/2014041665788781.pdf.

but it is also our property."[149] Allocating the appropriate amount of royalties or revenue to the local area is challenging. Here it seems that there could be a conflict in regards to this allocation, but it remains to be seen whether this will materialize in the future. Besides disputes over royalties, there are also significant environmental and social costs that the local communities and peoples of this region could necessarily bear, and these costs may be difficult to offset or mitigate.

Today, local communities in this area rely on the Salar de Uyuni and its surrounding ecosystems for their economic survival. Historically, the Potosí Department has been affected by the economic, social and political dynamics of resource extraction since colonial times.[150] Local political and civil society leaders in Potosi "do not want to see again the disastrous impact of silver and tin exploitation in the past, and hope that lithium can offer an avenue to depart from former extractive patterns."[151] Nearly all of the economic activity in the region "revolves around salt harvesting, quinoa production, llama herding, mining, and, more recently, a boom in foreign tourists seeking out the unique desolate landscape of the Salar."[152] The extraction of lithium may cause significant consequences. Tourism and quinoa production could be significantly impacted and they are especially important in this region because they provide a sustainable, long-term economic lifeline to the area."[153] While the expectations for the economic benefits from lithium are also high across the board, the actualized benefits in regard to job generation and return in terms of fiscal revenue to the region and the local population

[149] Romero, Simon. "In Bolivia, Untapped Bounty Meets Nationalism." The New York Times. February 02, 2009. http://www.nytimes.com/2009/02/03/world/americas/03lithium.html.
[150] Carbonnier, Gilles, and Elizabeth Jiménez Zamora.
[151] Ibid.
[152] Rebecca , Hollender, and Jim Shultz.
[153] Ibid.

are unclear. There is a misconception that the lithium project will bring a large quantity of new jobs to the region: official estimates only predict 700-1500 jobs and who those jobs will go to is unclear.[154] Local jobs tied to the lithium project may not offset the negative externalities associated here with quinoa production and water.

The area around the Uyuni salt flat is characterized by the growing of quinoa.[155] Quinoa is uniquely suited for the difficult climate of the Salar region, and currently there are few other livelihood options outside of quinoa production.[156] Quinoa has been prioritized by the government as a source to increase the country's income and its production has intensified because of the increasing prices on the international market; the price of quinoa sold by a farmer has almost tripled from 1999 to 2008.[157] Domestic consumption has decreased and now ninety percent of the total quinoa production is now exported.[158] However, ground water diversion and contamination associated with mining activities could threaten this agricultural production.[159] A serious water crisis due to mining could occur, because the region is already short of this resource for traditional agriculture and herding.[160]

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[154] Ibid.
[155] Jacobsen, S.-E. (2011), The Situation for Quinoa and Its Production in Southern Bolivia: From Economic Success to Environmental Disaster. Journal of Agronomy and Crop Science, 197: 390–399. doi:10.1111/j.1439-037X.2011.00475.x
[156] Walsh-Dilley, Marygold. "Negotiating Hybridity in Highland Bolivia: Indigenous Moral Economy and the Expanding Market for Quinoa." *Journal of Peasant Studies* 40, no. 4 (2013): 659-82. doi:10.1080/03066150.2013.825770.
[157] Jacobsen, S.-E.
[158] Ibid.
[159] Ibid.
[160] "State of the World's Minorities and Indigenous Peoples 2012." Minority Rights Group International. June 2012. http://minorityrights.org/wp-content/uploads/old-site-downloads/download-1112-State-of-the-Worlds-Minorities-and-Indigenous-Peoples-2012-full-text.pdf.

Currently, “the situation in the southern altiplano is severe with decreasing water resources available”, and the mining industry competes for these water resources.[161] Indigenous communities have also expressed concern over the potential for a serious water crisis as a result of mining in this area.[162] The state provides a legal framework for water in the constitution saying that it “shall protect and guarantee the priority use of water for life” and “the State shall recognize, respect and protect the uses and customs of the community, of its local authorities and the rural native indigenous organizations over the right, management and administration of sustainable water.”[163] Despite this legal framework, the Bolivian national government may not enforce these regulations. Marco Octavio Ribera, of Bolivia’s Environmental Defense League (LIDEMA), stated that, “not one environmental impact assessment has ever stopped a potentially risky project in Bolivia.”[164] It also seems that the Bolivian national government has not taken the appropriate steps to understand the impacts the extraction of lithium could have. Elizabeth Lopez Canelas, of the Bolivian Forum on Environment and Development (FOBOMADE), stated that, “there’s no information, no water use nor hydrological studies, so how can they begin to project what the long-term effects might be? This is supposedly a project to improve the region, but what if it makes living impossible? How could it be called sustainable development?”[165] As mentioned earlier, while there is an appropriate legal framework for natural resource extraction, the institutionalized enactment of that framework frequently falls to the wayside and may affect local peoples living in this region.

[161] Jacobsen, S.-E.
[162] Minority Rights Group International, *State of the World's Minorities and Indigenous Peoples 2012*.
[163] "Bolivia (Plurinational State of)'s Constitution of 2009."
[164] Rebecca , Hollender, and Jim Shultz.
[165] Ibid.

Here, the appropriate steps have not been taken to mitigate in the future the negative effects on water in the area and on quinoa production.

Other counties that extract lithium from salt brines have faced this same problem. Argentina, another state within the lithium triangle, has been producing lithium for years now but indigenous groups have faced significant hardships. In 2011, the International Commission of Jurists (ICJ) called on the State of Argentina to take effective measures to protect the human rights of indigenous groups, which had been adversely affected by lithium exploration and exploitation.[166] Indigenous communities of the Subcuenca and Laguna de Guayatayoc, in the Salinas Grandes, alleged "that the authorities have denied them the right to be consulted on the use of resources on their territories", which is a right guaranteed by the International Labour Organization Convention 169 and is also contained in the United Nations Declaration on the Rights of the Indigenous Peoples.[167] The ICJ found that private companies were "already damaging the salt flats and surrounding highly fragile natural environment, including the water tables and freshwater resources, which the indigenous groups depend on for their livelihoods and cultural and economic well-being."[168] As in the case of Argentina, local concerns and livelihoods are subservient to lithium extraction, and these negative consequences were not properly accounted for or remediated. This could end up being in the situation in the Salar de Uyuni region.

[166] "Lithium exploitation in Northern Argentina violates indigenous people's rights." December 14, 2011. Accessed February 3, 2017. http://www.icj.org/wp-content/uploads/2012/06/Argentina-exploitation-violates-rights-press-release-2011.pdf.
[167] Ibid.
[168] Ibid.

Tourism in this area may not be significantly impacted because of the sheer size of the Salar. The Salar de Uyuni is a 10,582 square kilometer salt plain, and while it is the second most popular tourist attraction in the country, the area of lithium extraction would possibly only be a small percentage of the salt plain.[169] The state has indicated that it would extract lithium from a 400 square kilometer area. Additionally, the current pilot plants, prospecting wells and pools are situated in the southeastern part of the plain, 140km from the town of Uyuni, and they cover 27 square kilometers total.[170] It is unlikely, at least in the near future, that tourism will be significantly affected in terms of not being able to utilize the Salar de Uyuni. However, tourism operators have expressed concern that this project could affect their viability and their livelihoods.[171] Tourism could be impacted if there are again difficulties with water among other things. Additionally, if this lithium project become a significant blight on the landscape in the future, then tourism could be affected. These effects may or may not be realized, but the Bolivian national government should seek to mitigate these effects.

Finally, this section ends with precept six, "Nationally owned companies should be accountable, with well-defined mandates and an objective of commercial efficiency."[172] For example, national companies can, if assigned inappropriate roles or governed poorly, pose a risk to a country and take away value rather than create value.[173] Inefficiency or the self-interest of executives can limit or drain government revenues as well. This guideline was difficult to apply in practice to Bolivia's nationalized companies as I faced difficulties

[169] López, Rafael Sagárnaga.
[170] Ibid.
[171] Rebecca , Hollender, and Jim Shultz.
[172] Natural Resource Charter.
[173] Ibid.

determining their accountability. I have included this precept because it is still a guideline that the Bolivian national government should attempt to adhere to.

D. Managing Revenues

This section is concerned with the revenues gained from natural resource extraction. Revenues from extraction can greatly benefit a government and its citizens in the present and the future. Additionally, the numerous ways in which revenues can be allocated present a state with the opportunity or perhaps the necessity of deciding how benefits from revenue should be distributed and to who. Here, the government "should consider two overriding objectives: promotion of equity, both between generations, and across society; and efficient use of revenues to maximize welfare."[174] Towards the first point, the government must decide how much of the revenue should benefit citizens in the present, and how much should be invested for future generations. Secondly, a government may also decide to distribute resource revenues selectively across society by targeting those living in poverty, those living in communities nearer to extraction sites, or to specific regions of the state.[175] Given these objectives, precept seven of the *Natural Resource Charter* states that "the government should invest revenues to achieve optimal and equitable outcomes, for current and future generations."[176]

The Bolivian state's management of natural resource revenues can be observed and analyzed through the revenues the Bolivian national government currently earns from the

[174] Natural Resource Charter.
[175] Ibid.
[176] Ibid.

extraction of oil and gas. In 2014, the oil and gas sector within Bolivia represented 8.7 percent of its GDP and 55 percent of total exports and the sector has in recent years contributed to more than one third of the Treasury's income.[177] Bolivia has a strong stake in the hydrocarbon sector through its "direct tax on hydrocarbons (Spanish acronym, IDH)", the state company, YPFB, and royalties. The hydrocarbons sector is of immense importance to Bolivia's economy and tax regime.

Bolivia is formed into nine departments which in total contain 339 municipalities. The government has allocated significant revenues from oil and gas to subnational authorities; In 2011, oil and gas revenue share allocated to subnational authorities was at around 60 percent of the total government take.[178] Departments in of themselves raise very little source revenue, and their revenue consists largely of inter-governmental transfers of oil and gas revenue shared through royalties and IDH.[179] From 2005 to 2012, IDH and royalties represented an average of 78 percent of the total transfers made to departments. Bolivian municipalities also rely on IDH revenue as well since they raise very little own-source revenue. From 2005 to 2012, IDH revenue represented an average of 37 percent of total transfers to municipalities.[180] Governments at the departmental level within Bolivia "spend the larger part of their hydrocarbon revenue in transport infrastructure (roads and bridges), while municipal governments tend to use these revenue more for education, health, and basic sanitation."[181]

[177] "Bolivia Revenue Sharing." February 2016. http://www.resourcegovernance.org/sites/default/files/nrgi_sharing_Bolivia_case-study.pdf.
[178] Aresti, María Lasa. "Oil and Gas Revenue Sharing in Bolivia." April 2016. http://www.resourcegovernance.org/sites/default/files/documents/oil-and-gas-revenue-sharing-in-bolivia_0.pdf.
[179] Ibid.
[180] Ibid.
[181] Ibid.

Within Bolivia, the law "assigns more responsibilities regarding infrastructure to departments, while social services' competencies are assigned to municipalities".[182]

Revenue from the Direct Tax on Hydrocarbons (IDH) at the Departmental and Municipal levels is supposed to be used across all levels of society. For instance, Departments' prefectures should spend their IDH revenue on "economic development: roads, rural electrification, irrigation, technical assistance and training of the private sector".[183] IDH revenue is also supposed to go towards "social development: infrastructure, maintenance, equipment, and capacity building in the health and education sectors".[184] Municipalities should spend their IDH revenue on education, health, local economic development and employment promotion and citizen security among other things.[185]

Currently, the "location of extractive projects and to some extent population are the main criteria for allocating oil and gas revenue across subnational governments in Bolivia", but "this redistribution does not take into account social or economic characteristics such as Human Development Index scores".[186] IDH revenues are also allocated to "universities, indigenous groups, elderly population through the *Renta Dignidad* fund, school students through the cash transfer *Bono Juancito Pinto*, and the police and military forces".[187]

The *Renta Dignidad* scheme in particular is conceptualized as a universal pension funded by hydrocarbons. It is described by the Bolivian Ministry of Autonomy and the Bolivian Ministry of Economy and Public Finance as being "the concrete result of the nationalization of our

[182] Ibid.
[183] Ibid.
[184] Ibid.
[185] Ibid.
[186] Ibid.
[187] Ibid.

natural resources. These resources now go directly to the hands of those who most need them. It is a sustainable measure that does not represent the privatization of national companies nor the loss of our natural wealth and patrimony."[188] While labor income contributed more overall to reducing inequality and poverty within Bolivia in the past years, there is evidence that non-labor income benefited their specific target populations like the elderly (Renta Dignidad).[189]

This suggests that the government of Bolivia has allocated its hydrocarbon revenue across multiple spectrums of society, in large part because it is a key source of income within the tax regime. The intentions of the national government are aimed at increasing the well-being of its citizens through social programs and hydrocarbon revenue has played a role in that. In regards to lithium, this account of the hydrocarbons sector suggests that the government has at least the intention to prudently allocate any revenue from a lithium mining sector into beneficial social programs for its citizens that also takes into account benefiting local communities. The next precept within this section suggests ways in which revenue volatilities can be avoided.

Depending on the extractive industry, future revenues from a natural resource can be relatively uncertain. To prevent revenue dependence on resource extraction, diversification of the economy is a long-term solution to this problem. Diversification of Bolivia's economy will be discussed in the next section. However, in the short term, another strategy is to "form a fund with surplus revenues to accumulate foreign assets in boom times, and liquidate those assets

[188] Segal, Paul. "How to spend it: Resource wealth and the distribution of resource rents." *Energy Policy* 51 (December 2012): 340-48. doi:10.1016/j.enpol.2012.08.029.
[189] Ibid.

(or borrow if these are insufficient) when revenues fall."[190] Ultimately, these ideas are summed up in precept eight which states that "the government should smooth domestic spending of revenues to account for revenue volatility."[191]

Bolivia specifically has run budget surpluses every year from 2006 to 2014, and this has allowed it to draw down the public sector's debt and to build up its international reserves, from $1.7 billion in 2005 to $15.1 billion in 2014.[192] This growth is due to Bolivia having experienced a boom in both the volume of its gas and mining exports as well as the price they fetched abroad. Export revenues in the decade after Evo Morales became president grew from $2.2 billion just before his election to $12.9 billion at the peak of the boom.[193] The Bolivian government is currently taking advantage of the economic cushions it accumulated during the boom to contain the effects of current low commodity prices.

Again, this buildup of international reserves through hydrocarbon revenue suggests a prudent macroeconomic approach by the national government. Here, it seems that Bolivia took into account the volatilities of the hydrocarbon sector. Today, it is using its reserves to mitigate the effects of the current low commodity prices. A lithium industry within Bolivia and any revenue gained from such would hopefully follow the same paradigm detailed above in regards to the hydrocarbon sector. The Bolivian government seems to have met these precepts in regards to the management of revenues, but that is not to say that there isn't room for improvement. This section suggests that Bolivia has recently managed its revenues from natural

[190] Natural Resource Charter.
[191] Ibid.
[192] Toro, Francisco. "As socialist Venezuela collapses, socialist Bolivia thrives. Here's why." January 05, 2017. https://www.washingtonpost.com/news/global-opinions/wp/2017/01/05/as-socialist-venezuela-collapses-socialist-bolivia-thrives-heres-why/?utm_term=.f6ee07137fd3.
[193] Ibid.

resource extraction well. The next section is more critical in regards to a specific aspect of managing revenues, public spending and investment.

E. Investing for Sustainable Development

This section again looks at the revenues accrued from natural resource extraction, but in the context of it being used to benefit the economy and to particularly mitigate any negative consequences of a large extractive industry. Effective public spending management here can be a hedge against economic decline.[194] Resource revenues, as presented above, have given Bolivia the opportunity to undertake and increase public spending programs and to amass large foreign reserves. Yet, public spending and effective investment can be challenging particularly in regards to diversifying an economy away from extractive industries. In regards to the effective management of public spending, precept nine of the *Natural Resource Charter* argues that "the government should use revenues as an opportunity to increase the efficiency of public spending at the national and sub-national levels."[195]

Currently, the Bolivian government faces challenges in the effective management of public spending programs with implications for its current hydrocarbon industry as well as a future lithium industry. The overall limited administrative capacity of Bolivia has resulted in an inability to effectively develop and execute programs.[196] Additionally, improving the efficiency of social spending and better targeting would require building capacity to means test benefits,

[194] Natural Resource Charter.
[195] Ibid.
[196] Kohl, Benjamin, and Linda Farthing. "Material constraints to popular imaginaries: The extractive economy and resource nationalism in Bolivia." *Political Geography* 31, no. 4 (2012): 225-35. doi:10.1016/j.polgeo.2012.03.002.

introducing more competition in the provision of social services, and more focus on performance.[197] The process to build this capacity is ongoing. For instance, the national government received a loan from the Inter-American Development Bank (IDB in 2013) for $106 million to improve and strengthen mechanisms for effective, efficient, and transparent public expenditure.[198] This program is to introduce, among other things, results-based management in central government agencies by means of performance agreements and the drafting of multiyear budgets in State-owned enterprises and central government agencies.[199] The building of this administrative capacity is an ongoing process that will have future ramifications for the effective spending of any natural resource revenues. In regards to hydrocarbon revenue sharing, the objectives are also not clearly codified and there are no available studies to show a direct impact of revenue sharing on socioeconomic indicators, such as poverty; Additionally, "even when statutory instruments mandate the setting of objectives, performance indicators and monitoring and evaluation systems, these are not implemented in practice."[200] Overall, efficient public spending in Bolivia is specifically challenged by a lack of administrative capacity. Hydrocarbon revenue sharing also suggests that the state lacks clear objectives for this revenue and the ability to directly measure the impacts of social programs. This limited ability to effectively implement public spending programs can potentially have significant effects on the government's ability to diversify the economy. Bolivia, in particular, has unprecedented

[197] "Bolivia: 2016 Article IV Consultation." December 2016. https://www.imf.org/external/pubs/ft/scr/2016/cr16387.pdf.
[198] "Bolivia will improve effectiveness of public spending with IDB support." September 9, 2013. http://www.iadb.org/en/news/news-releases/2013-09-09/bolivia-improve-effectiveness-of-public-expenditure,10559.html.
[199] Ibid.
[200] Aresti, María Lasa.

reserves from its hydrocarbon revenue but the state is still facing significant challenges diversifying the economy and generating job-driven economic growth.[201]

A key role of the government in the governance of natural resources is to reduce negative consequences from a large extractive industry on the economy, as explained earlier.[202] The proactive use of natural resource revenues can grow the domestic economy through significant increases in private sector investment, but "encouraging sustained growth beyond resource extraction has been a problem for many resource-rich countries."[203] The establishment of an enabling environment for private investment can build the economy's capacity to absorb private investment and to lower private investment costs.[204] These observations come to head with precept ten of the *Natural Resource Charter*, which states, "the government should facilitate private sector investments to diversify the economy and to engage in the extractive industry."[205] Here, I will again look to the hydrocarbons sector and the application of the state's revenues as a source of analysis.

Between 2002 and 2014, Bolivia experienced significant economic growth. This record growth has again occurred partially because of high commodity prices that were matched with high volumes of gas exports to Brazil and Argentina. Revenue windfalls due to gas exports resulted in "an increase in external and fiscal savings while managing to stage a substantial fiscal expansion."[206] Although Bolivia has maintained successful economic trends, the current

[201] Kohl, Benjamin, and Linda Farthing.
[202] Natural Resource Charter.
[203] Ibid.
[204] Ibid.
[205] Ibid.
[206] "International Development Association International Bank For Reconstruction and Development International Finance Corporation and Multilateral Investment Guarantee Agency Country Partnership Framework for the Plurinational State of Bolivia for the Period FY16-FY20." November 4, 2015.

fall in commodity prices poses a challenge for the country's economic management. The hydrocarbon sector accounts for almost half of total exports and one third of fiscal revenues and lower gas prices will have a significant negative effect on fiscal and external balances.[207] Bolivia is strongly dependent on natural resource extraction which poses significant risks. Therefore, there is a need to develop non-extractive sectors of the economy so that advancements in reducing poverty and increasing shared prosperity can be sustained.

The government of Bolivia in its 2016-2020 National Economic and Social Development Plan hopes to maintain growth at an average rate of 5 percent between 2016 and 2020 and to reduce extreme poverty from 17 percent to 10 percent; this in part will be accomplished through an "extensive public investment program funded in part by savings accumulated during the economic boom, Bolivian Central Bank (CB) loans and external financing".[208] This same plan calls for increased private sector activity and foreign direct investment as well as investments in the general areas of infrastructure, hydrocarbon exploration, industrialization of natural gas (fertilizers and plastics) and hydroelectric energy generation.[209] This ambitious development agenda faces structural challenges given the lack of administrative capacity to effectively manage these projects. Bolivia's efforts to diversify the economy and to industrialize the country are uncomplete, and development of a lithium extraction industry is one facet of Bolivia's overall plan to do so. The narrative above suggests that perhaps the difficulties Bolivia has had in partnering with foreign firms and beginning the industrial production of lithium may

http://documents.worldbank.org/curated/en/921771468186539912/pdf/100985-REVISED-OUO-9-R2015-0221.pdf.

[207] Ibid.

[208] Bolivia Overview." The World Bank.

[209] Ibid.

in part be due to a lack of administrative capacity and the inability to implement effective public spending.

F. International Foundations for Resource Governance

This last section of the *Natural Resource Charter* is concerned with the interaction between private sector companies, international organizations, and governments and the standards that they uphold. For example, "governments and companies should fully account for the rights of indigenous peoples" and, "where free, prior and informed consent to extraction is required by law, companies must obtain consent ahead of any work taking place on indigenous lands, and should furthermore meaningfully engage and consult with local communities that may be significantly affected by extractive operations."[210] In all, precept eleven states, "companies should commit to the highest environmental, social and human rights standards, and to sustainable development."[211] I will first discuss this precept in terms of K-UTEC and then will move on to Bolivia's nationalized lithium company.

It is difficult to ascertain here what environmental standards K-UTEC Ag Salt Technologies will uphold. The company is only going so far as to design the lithium production process, as mentioned earlier. The director of the company, Heiner Marx has said that "we evaporate only the brine from the Salar, not the drinking water from the communities around".[212] At minimum, there is at least a recognition on the part of K-UTEC Ag Salt

[210] Natural Resource Charter.
[211] Ibid.
[212] Opray, Max. "Electric car boom fuels interest in Bolivia's fragile salt flats." January 17, 2017. https://www.theguardian.com/sustainable-business/2017/jan/17/white-gold-companies-search-lithium-bolivia.

Technologies that they will attempt to avoid affecting the drinking water of local communities. Given the generally secretive nature of natural resource extraction, and thus little information on the process K-UTEC is designing, it is impossible to say what standards they are upholding. The largest concerns here are once Bolivia finds a foreign firm for the industrial production of lithium. These standards will then be incredibly relevant. Since the actual state of this project is in flux and is quite amorphous, it is difficult to apply the *Natural Resource Charter* here to K-UTEC other than to say that this standard should be applied in the future.

The commitment to environmental, social and human rights standards is most worrisome here in regards to the conduct of the state of Bolivia. As shown earlier, despite free, prior and informed consent to extraction for indigenous peoples being codified within Bolivia's constitution, the actual practice of consultation to date has not followed these standards. The conflict exists partially because the company doing the consultation is owned by the state government. Outside of indigenous rights, it is also clear that Bolivia doesn't uphold certain standards. As stated earlier, the Bolivian national government faces particular difficulties when concerning environmental standards. The Bolivian national government still has much to do in terms of enforcing codified rights and towards upholding institutionalized standards. The next precept in this section discusses how international organizations can help affect ongoing natural resource governance.

Precept twelve states, "governments and international organizations should promote an upward harmonization of standards to support sustainable development."[213] This precept is difficult to apply as it is a suggestion for how international organizations can influence countries

[213] Natural Resource Charter.

like Bolivia. It is a best practice that concerns the entire international community. In a sense, the *Natural Resource Charter* is part of this ongoing harmonization of standards as it suggests normative guidelines and best practices for natural resource extraction. Bolivia's involvement with international organizations like the United Nations can promote this upward harmonization by helping to build the capacity of the government, the legislature, the media and civil society in these respective countries.[214]

This ends the discussion of how the *Natural Resource Charter* might be applied in Bolivia. Throughout this section, I have identified problems or challenges that Bolivia faces in regards to its lithium project. I have also identified positive actions the Bolivian national government has taken. The next section is the conclusion of this thesis and it will sum both the negative and positive actions of the Bolivian national government while also offering recommendations.

[214] Ibid.

V. Recommendations

The application of the *Natural Resource Charter* to Bolivia and its lithium deposits complicates this dream of lithium, and indicates as well that the national government's ability to govern this natural resource to these standards is not possible at this time. However, this doesn't suggest that the state couldn't manage the extraction of lithium to some degree or will undermine this project to the point that it isn't beneficial. Rather it suggests ways that the Bolivian national government can improve its natural resource governance. In this section, I will lay out these challenges and ways in which they can possibly be mitigated or resolved. Some of these challenges, such as improving the administrative capacity of the Bolivian national government, could have their own respective theses. I have grouped these challenges into broad overarching themes that are more a narrative than a point by point analysis.

First, a large concern that exists for this project is how the Bolivian national government sees it in context of the overall economy. As described earlier, Bolivia operates within a neoextractivist framework where the state relies heavily on its hydrocarbons sector for its economy, the wellbeing of its citizens, and for its fiscal regime. This dream of lithium as evidenced by state rhetoric falls within this same framework. However, while the Bolivian government has benefited in the past from this neoextractivist developmental model, lower commodity prices threaten its longevity. This is recognized by the state government as well. I would be particularly concerned if the Bolivian national government maintains or sees lithium as a future analog to its hydrocarbon sector, rather than as an opportunity to diversify the economy in general. The extraction of lithium at the Salar de Uyuni could possibly be a significant opportunity, but the state shouldn't conceive of it as the sole option to diversify the

economy and to bring in private investment. The state should maintain an accurate understanding of its lithium base and should seek to find appropriate terms with foreign partners so that it does not stunt the potential of this industry. Rather than clouding this resource with ambition and rhetoric, an accurate and clear projection of the Salar de Uyuni's resources may help the Bolivian state accomplish its goals, while also presenting transparent information to its citizens. In all, Bolivia should see the production of lithium an opportunity to further diversify the economy in light of its dependence on hydrocarbons.

Another broad issue concerning this project is corruption and the actual implementation of the Bolivian legal framework by its institutions. Widespread corruption within the Bolivian state could affect its ability to properly manage its lithium deposits. Secondly, neoextractivism has taken precedence over the rights afforded to indigenous groups and stipulations regarding water and the environment. For instance, despite a framework of rights codified to indigenous peoples within Bolivia's constitution, like the right to prior obligatory consultation, the actual upholding of these rights does not occur to the degree that they should. This not only undermines Bolivia's legal framework, but conflicts between indigenous groups or local peoples and the national government could occur in the future because they weren't consulted prior to the implementation of this lithium project. This observation leads to more narrow challenges that are specific to this lithium project and the Salar de Uyuni region.

The Bolivian national government should rethink its national strategy if it has not already done so. Since the project is significantly behind schedule, a new roadmap that is realistic could help the government effectively govern this resource. However, a national strategy that is comprehensive also means that the state should take into account the

detrimental externalities of the Salar de Uyuni that could affect the state's ability to industrialize its lithium resource. Simply put, the state should not push ahead to the industrial production of lithium without ensuring that its process for doing so is profitable in the context of the larger marketplace. Given that the state has at times not conducted public spending programs effectively, this could be a real concern. There are various accounts or speculations about the Salar de Uyuni's value, so it is difficult to say if this will become in monetary terms a great benefit. Corporations that are looking to extract lithium or need it may look to other countries, like Chile or Argentina. Another issue within constructing a viable and beneficial national strategy for this lithium project is that of consultation.

For instance, the Bolivian government maintains the Salar de Uyuni as a fiscal reserve, but the boundaries of this reserve are opaque. This could become a source of conflict for the various communities in the area and the state. The state here should consult with the local communities to make clear these differing accounts of territory. The Bolivian government should also strive to engage and involve all of the various groups and individuals of the Salar de Uyuni region. Politicizing consultation and not addressing concerns now may lead to conflict in the future or affect the state's ability to best implement the industrial production of lithium. I am particularly concerned that the Bolivian state has not taken the appropriate steps to determine the extent to which the lithium project will affect the environment, particularly local water resources. This could severely impact local quinoa farmers whose livelihood is intimately attached to this resource within this ecosystem. Effects to tourism and quinoa production must be mitigated as the local communities and individuals could have their livelihoods rendered unsustainable if local water resources are effected severely. However, their concerns may be

ignored in light of neoextractivism; this is again a recurring challenge or theme for the Bolivian government. The national government's prioritization of natural resources comes into conflict with its own legal standards as well as the ones that the *Natural Resource Charter* suggest.

Finally, as shown by the analysis of hydrocarbon revenues, the Bolivian national government's intentions towards uplifting the well-being of its citizens is apparent. Hydrocarbon revenues are intrinsic to the functioning of subnational governments and citizens have likely improved from the state's social services programs. This idea is one of many that are present in its neoextractivist framework. Its allocation of revenues could be improved in the case of a lithium project. The national government should consult with local communities to balance or determine the allocation of revenues given to the Potosí Department. Since the extraction of lithium would by necessity affect them the most, negative ramifications could be partly mitigated by earmarking an appropriate amount of the revenue for the Salar de Uyuni region. Given the poverty present here, this could be an opportunity for the national government to conduct effective social programs that fall in line with their stated goals.

The state should also look to better target its citizens living in extreme poverty and should also implement studies to better measure the impact of its revenue sharing and social programs on socioeconomic indicators. This would facilitate, in the future, more effective public spending. This implementation is dependent on building the administrative and institutional capacity of the Bolivian national government, and this again remains a recurring theme for effective natural resource governance within this country. The Bolivian national government has managed its economy very well recently, but it faces challenges in the future because of low commodity prices. The state seems to be on the right approach towards diversifying its

economy to alleviate the ramifications of low commodity prices. It has also maintained strong fiscal reserves that allow it to alleviate this current dilemma. This suggests that the Bolivian national government can manage lithium well in terms of revenues, although it could do so more effectively.

Given these challenges, and in line with the last section of the application stage, the Bolivian national government should strive to meet these challenges and properly account for them. I am however skeptical that they will, given this neoextractivist framework that the country operates through as well as problems concerning its institutions, like corruption. Bolivia's civil society, its media and its non-governmental organizations, as well as the people living around the Salar could check or influence the government' behavior towards any possible mismanagement of this resource. While there at times there has been opposition from the state against these organizations, they still remain as a tool to uphold indigenous rights or reveal issues with the use of water among other concerns. International organizations like the United Nations could also facilitate the Bolivian state's ability to meet these standards and challenges.

The national government of Bolivia has the capacity to realize this lithium project but it may not have the capacity or the intention to manage it beneficially in the light of other stakeholders and the concerns laid out above. There are particular concerns the state should overcome and it may do so. In its present incarnation, the extraction of lithium in Bolivia is best described as hopeful. People are hopeful that climate change can be mitigated and that electric cars will become increasingly widespread. The companies that manufacture electric cars, lithium-ion batteries, and extract lithium are hopeful that this becomes the case too. Bolivia is

hopeful that the Salar de Uyuni becomes a valuable resource that can be used to improve the economy and to uplift its citizens, and the people around the Salar de Uyuni and I myself hope that the state can manage it effectively. Given these hopes and their role in realizing a larger goal of mitigating climate change, it is best that we remain cognizant of the effects a shift to electric cars entails. Natural resource extraction, particularly that of oil and gas and now lithium, has consequences. While the introduction of an overall more beneficial manifestation of the automobile is increasingly possible, we should be aware of what it entails in its entirety. It remains to be seen whether electric cars will takeoff and whether the effects of this takeoff will distinctly impact Bolivia, but this possibility is something I am hopeful that one day the state can manage beneficially.

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Author Biography

Davis Sehlke was born on January 21, 1995 in Austin, Texas. He enrolled in the University of Texas at Austin in August 2013 and will graduate in May 2017 as a Plan II and History major. Davis studied abroad in Würzburg, Germany in the summer of 2016 and has greatly enjoyed his time at UT. Whatever his future holds, Davis will draw upon the skills and experiences that Plan II gave him.